PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : H04B 1/03	A1	(11) International Publication Number: WO 90/13951
		(43) International Publication Date: 15 November 1990 (15.11.90)

(21) International Application Number: PCT/US90/01955

(22) International Filing Date: 12 April 1990 (12.04.90)

(30) Priority data:
345,739 1 May 1989 (01.05.89) US

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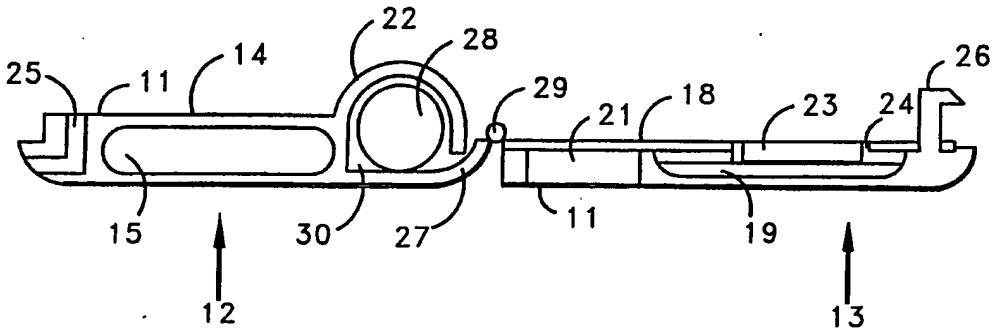
(81) Designated States: AT (European patent), BE (European + patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), NO, SE (European patent).

Published
With international search report.
With amended claims.

(54) Title: THIN ARTICULATED PAGER



(57) Abstract

A housing for a battery powered pager folds while not in use to protect external components such as as controls (16 and 17) and a display device and has a tichkness when folded approximately the same as the thickness of the battery (28). The housing encompasses electronic circuitry (23) for receiving a message and alerting the user of the message, and comprises a first member (12) having a cavity therein. A second member (13) has a second cavity and is rotatably coupled to the first member and is capable of being placed in first and second positions relative to the first means, wherein the first position is one wherein the first and second cavities cooperate to accommodate the battery (28).

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THIN ARTICULATED PAGER

Field of the Invention

This invention relates in general to selective call receivers such as pagers, and more specifically to a housing for a battery powered pager that folds to protect external components while not in use and whose thickness when folded is approximately the same as the thickness of the battery.

Background of the Invention

Selective call radio receivers such as pagers are used to alert a user of a message. Such devices generally incorporate a radio receiver capable of producing either an audible alerting signal which may be heard by the user or a vibrating sensation which may be felt by the user. Some pagers provide the additional features of a voice message following the audible alert or a message visually displayed on a screen.

Pagers typically are manufactured in many different shapes to fulfill different user requirements. For example, pagers are manufactured in the shape of a cigarette pack for attachment to a belt, in the shape of a pen for attachment to a shirt pocket, or in the shape of a credit card for insertion into a shirt pocket or billfold. Each of these different shaped pagers typically require substantially the same components, i. e., speaker, battery, antenna, switches, display screen, printed circuit board for the electronic circuit elements.

It is desirable that the pager be small in physical dimensions so as not to be cumbersome to the user. Pen shaped and credit card shaped pagers were designed for this very reason. Even so, reduced dimensions continues to be a major factor in pager designs. However, the size of the components mentioned above have placed restrictions on pager dimensions. For example, although improved technology has reduced battery size in recent years, battery size continues to be relative large.

Thus, what is needed is a housing for a battery powered pager that folds while not in use to protect external components and whose thickness when folded is substantially the same as the thickness of the battery.

Summary of the Invention

Accordingly, it is an object of the present invention to provide an improved selective call receiver.

Another object of the present invention is to provide a selective call receiver that folds while not in use to protect external components and whose thickness when folded is approximately the same as the thickness of the battery.

In carrying out the above and other objects of the invention in one form, there is provided a housing for a battery powered pager that folds while not in use to protect external components such as controls and a display device and has a thickness when folded approximately the same as the thickness of a battery. The housing encompasses electronic circuitry for coupling to the battery for receiving a message and alerting the user of the message, and comprises a first member having a first cavity. A second member has a second cavity and is rotatably coupled to the first member and is capable of being placed in first and second positions relative to the first member, wherein the first position is one wherein the first and second cavities cooperate to accommodate the battery.

The above and other objects, features, and advantages of the present invention will be better understood from the following detailed description taken in conjunction with the accompanying drawings.

Brief Description of the Drawing

FIG. 1 is a block diagram of a prior art pager.

FIG. 2 is a top view of the preferred embodiment of the present invention in an open position.

FIG. 3 is a cross sectional side view taken along the dotted line 2-2 of FIG. 1.

FIG. 4 is a cross sectional side view taken along the dotted line 2-2 of FIG. 1 when the pager is folded into a closed position.

Detailed Description of the Invention

Referring to FIG. 1, a block diagram of a typical pager comprises a pager circuitry 1 coupled to each of an antenna 2, a battery 3, an alert apparatus 4, and a control apparatus 5 such as on/off, volume control, and display control switches for performing the pager operation well known to those skilled in the art. A display apparatus 6 may be included in the pager for visually displaying an alert or a message. For a more detailed description of the structure and operation of a selective call radio paging receiver of the type shown in FIG. 6, reference is made to U. S. Patent Number 4,518,961, issued May 21, 1885 and entitled "Universal Paging Device With Power Conservation"; U. S. Patent Number 4,649,583, issued March 10, 1987 and entitled "Radio Paging Device With Improved Test Modes"; and U. S. Patent Number 4,755,816, issued July 5, 1988 and entitled "Battery Saving Methods for Selective Radio Paging Receiver", the teachings of which are hereby incorporated by reference.

Referring to FIGs. 2, 3, and 4, the thin articulated pager in accordance with the preferred embodiment comprises a housing 11 including two members 12 and 13. The member 12 includes a plate 14 and encloses a cavity 15 for the pager circuitry 1, antenna 2, and alert apparatus 4. The control buttons 16 (control apparatus 5) protrude through the slots 17 in the plate 14.

The member 13 includes a plate 18 and encloses a cavity 19 for the pager circuitry 1, antenna 2, and alert apparatus 4. The member 18 further includes a cavity 21 for receiving a jacket 22 of member 14 when the members 14 and 18 are folded together as shown in FIG. 3. A display device 23, such as an LCD screen, protrudes through a slot 24 in the plate 18. The member 12 includes a slot 25 for receiving a latching mechanism 26 of the member 13 in the folded position. A battery door 27 is provided for inserting and removing the battery 28, which is located in the cavity 30. The members 12 and 13 and the battery door are rotatably coupled by hinges 29. The battery shown in the drawings is a AA type battery. However, the

invention could be implemented using any known type of battery, including a "button" or "disc" battery.

The pager normally would be stored in the folded position shown in FIG. 3. This folded position protects the display screen 23 from accidental damage, such as being scratched. Also, the control buttons 16 are protected from inadvertent activation. Upon an alert signal being received, the pager user would open (unfold) the pager similar to the position shown in FIGs. 1 and 2. The display screen 23 and control buttons 16 are then readily available for viewing and activation, respectively. The alert could be accomplished in any of several ways well known in the industry. A silent alert may be provided by a vibrating motor (not shown) attached within the housing 11 or by a tone emitted from the pager.

The item having the largest dimension that restricts the minimizing of the thickness of the pager is the battery 28. By designing the members 12 and 13 so that, in the folded position, they both accommodate the battery 28, the thickness of the pager in the folded position is only slightly greater than the diameter of the battery.

By now it should be appreciated that there has been provided a housing for a battery powered pager that folds to protect external components while not in use and whose thickness when folded is approximately the same as the thickness of the battery.

CLAIMS

1. A housing for a battery powered device, comprising:

a first member having a first cavity therein; and

a second member having a second cavity therein and rotatably coupled to said first member and capable of being placed in first and second positions relative to said first member, said first position being one wherein said first and second cavities cooperate to accommodate said battery.

2. The housing according to claim 1 wherein said first member comprises a jacket, a first portion of said battery positioned within said first cavity, and a second portion of said battery positioned within said jacket, said jacket protruding from said first means so as to be received by said second cavity in said first position.

3. The housing according to claim 2 wherein said device comprises a display means for displaying a message, wherein each of said first and second members comprises a first side, said first sides being contiguous in said first position, said display means positioned within either said first or second members so as to be visible at the respective of said first sides.

4. The housing according to claim 3 wherein said electronic device comprises a control means coupled to said display means for controlling said display means, said control means positioned within either said first or second members so as to be accessible at the respective of said first sides.

5. The housing according to claim 2 wherein said second means comprises a second side opposite of said first side, said jacket extending through said second means so as to be substantially flush with said second side.

6. A battery powered selective call receiver comprising:

first means for receiving a message;

second means coupled to said first means for alerting the user of the receipt of the message;

a housing having said first and second means attached therein, said housing comprising:

a first member having a first cavity therein; and

a second member having a second cavity therein and rotatably coupled to said first member and capable of being placed in first and second positions relative to said first member, said first position being one wherein said first and second cavities cooperate to accommodate said battery.

7. The housing according to claim 6 wherein said first member comprises a jacket, a first portion of said battery positioned within said first cavity, and a second portion of said battery positioned within said jacket, said jacket protruding from said first means so as to be received by said second cavity in said first position.

8. The housing according to claim 7 wherein said device comprises a display means for displaying a message, wherein each of said first and second members comprises a first side, said first sides being contiguous in said first position, said display means positioned within either said first or second members so as to be visible at the respective of said first sides.

9. The housing according to claim 8 wherein said electronic device comprises a control means coupled to said display means for controlling said display means, said control means positioned within either said first or second members so as to be accessible at the respective of said first sides.

10. The housing according to claim 7 wherein said second means comprises a second side opposite of said first side, said jacket extending through said second means so as to be substantially flush with said second side.

11. A housing for a battery powered electronic device, comprising:

a first member having a first cavity for receiving a first portion of said battery; and

a second member having a second cavity and rotatably coupled to said first member and capable of being placed in first and second positions relative to said first member, said first member contiguous to said second member in said first position so that said second cavity receives a second portion of the battery and said first member rotatably separated from said second member in said second position so that said second cavity does not receive the second portion of the battery.

12. The housing according to claim 11 wherein said first member comprises a jacket substantially enclosing said battery, a portion of said jacket covering the second portion of said battery protruding from said first member so as to be received by said second cavity in said first position.

13. The housing according to claim 12 wherein said electronic device comprises a display means for displaying a message, wherein each of said first and second members comprises a first side, said first sides being contiguous in said first position, said display means positioned within either said first or second members so as to be visible at the respective of said first sides.

14. The housing according to claim 13 wherein said electronic device comprises a control means coupled to said display means for controlling said display means, said control means positioned within either said first or second members so as to be accessible at the respective of said first sides.

15. The housing according to claim 12 wherein said second means comprises a second side opposite of said first side, said jacket extending through said second means so as to be substantially flush with said second side.

AMENDED CLAIMS
[received by the International Bureau on 3 September 1990 (03.09.90) ; original claims 3, 8, and 13 cancelled ; claims 1, 6, 11 amended ; claims 4, 5, 8, 7, 9, 10, 12, 14 and 15 renumbered as claims 3, 4, 5, 6, 7, 8,10, 11 and 12 respectively other claims unchanged (3 pages)]

1. A housing for a battery powered device, comprising:

a first member having a first cavity therein; and

a second member having a second cavity therein and rotatably coupled to said first member and capable of being placed in first and second positions relative to said first member, said first position being one wherein said first and second cavities cooperate to accommodate said battery;

said battery powered device comprising a display means for displaying a message, each of said first and second members comprises a first side, said first sides being contiguous in said first position, said display means positioned within either said first or second members so as to be visible at said first side thereof in said second position.

2. The housing according to claim 1 wherein said first member comprises a jacket, a first portion of said battery positioned within said first cavity, and a second portion of said battery positioned within said jacket, said jacket protruding from said first member so as to be received by said second cavity in said first position.

3. The housing according to claim 1 wherein said battery powered device comprises a control means coupled to said display means for controlling said display means, said control means positioned within either said first or second members so as to be accessible at said first side thereof in said second position.

4. The housing according to claim 1 wherein said second member comprises a second side opposite of said first side, said jacket fitting into said second cavity so as to be substantially flush with said second side when said first and second members are in the first position.

5. A battery powered selective call receiver comprising:

first means for receiving a message;

second means coupled to said first means for alerting the user of the receipt of the message;

a housing having said first and second means attached therein, said housing comprising:

a first member having a first cavity therein; and

a second member having a second cavity therein and rotatably coupled to said first member and capable of being placed in first and second positions relative to said first member, said first position being one wherein said first and second cavities cooperate to accommodate said battery; and

a display means for displaying a message, each of said first and second members comprises a first side, said first sides being contiguous in said first position, said display means positioned within either said first or second members so as to be visible at said first side thereof in said second position.

6. The battery powered selective call receiver according to claim 6 wherein said first member comprises a jacket, a first portion of said battery positioned within said first cavity, and a second portion of said battery positioned within said jacket, said jacket protruding from said first member so as to be received by said second cavity in said first position.

7. The battery powered selective call receiver according to claim 6 further comprising a control means coupled to said display means for controlling said display means, said control means positioned within either said first or second members so as to be accessible at said first side thereof in said second position.

8. The battery powered selective call receiver according to claim 7 wherein said second member comprises a second side opposite of said first side, said jacket fitting into said second cavity so as to be substantially flush with said second side when said first and second members are in the first position.

9. A housing for a battery powered electronic device, comprising:

a first member having a first cavity for receiving a first portion of said battery; and

a second member having a second cavity and rotatably coupled to said first member and capable of being placed in first and second positions relative to said first member, said first member contiguous to said second member in said first position so that said second cavity receives a second portion of the battery and said first member rotatably separated from said second member in said second position so that said second cavity does not receive the second portion of the battery;

the battery powered electronic device comprising a display means for displaying a message, each of said first and second members comprises a first side, said first sides being contiguous in said first position, said display means positioned within either said first or second members so as to be visible at said first side thereof in said second position.

10. The housing according to claim 11 wherein said first member comprises a jacket substantially enclosing said battery, a portion of said jacket covering the second portion of said battery protruding from said first member so as to be received by said second cavity in said first position.

11. The housing according to claim 11 wherein said electronic device comprises a control means coupled to said display means for controlling said display means, said control means positioned within either said first or second members so as to be accessible at said first side thereof in said second position.

12. The housing according to claim 12 wherein said second member comprises a second side opposite of said first side, said jacket fitting into said second cavity so as to be substantially flush with said second side when said first and second members are in the first position.

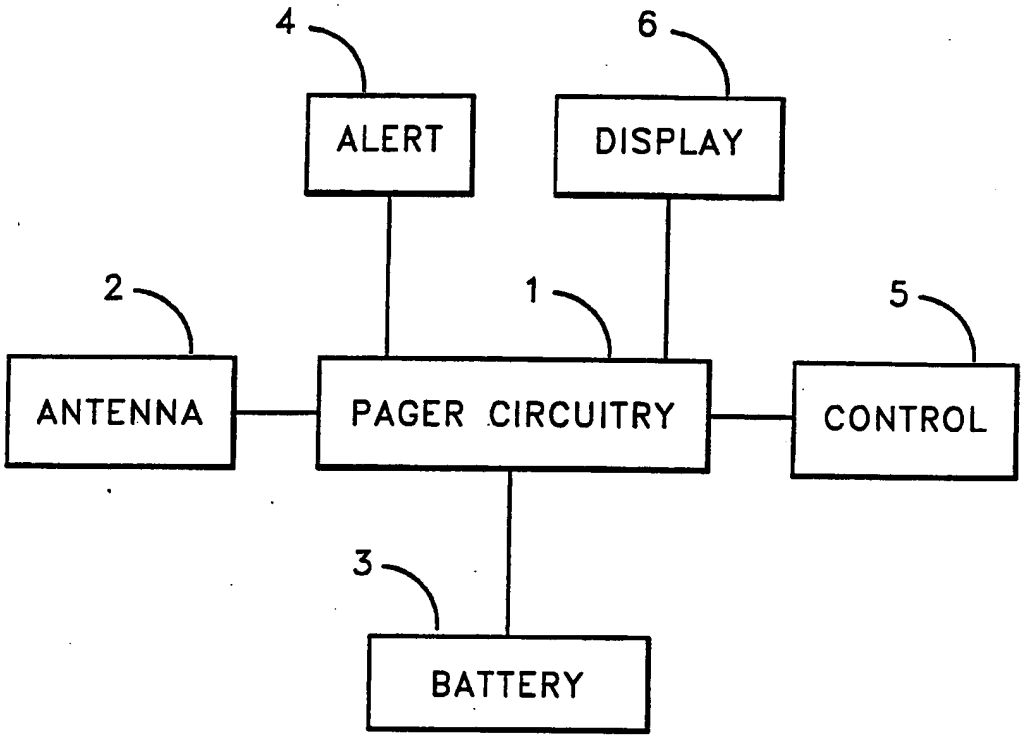
4
6
ALERT
DISPLAY
2
1
5
ANTENNA
PAGER CIRCUITRY
CONTROL
3
BATTERY

FIG. 1

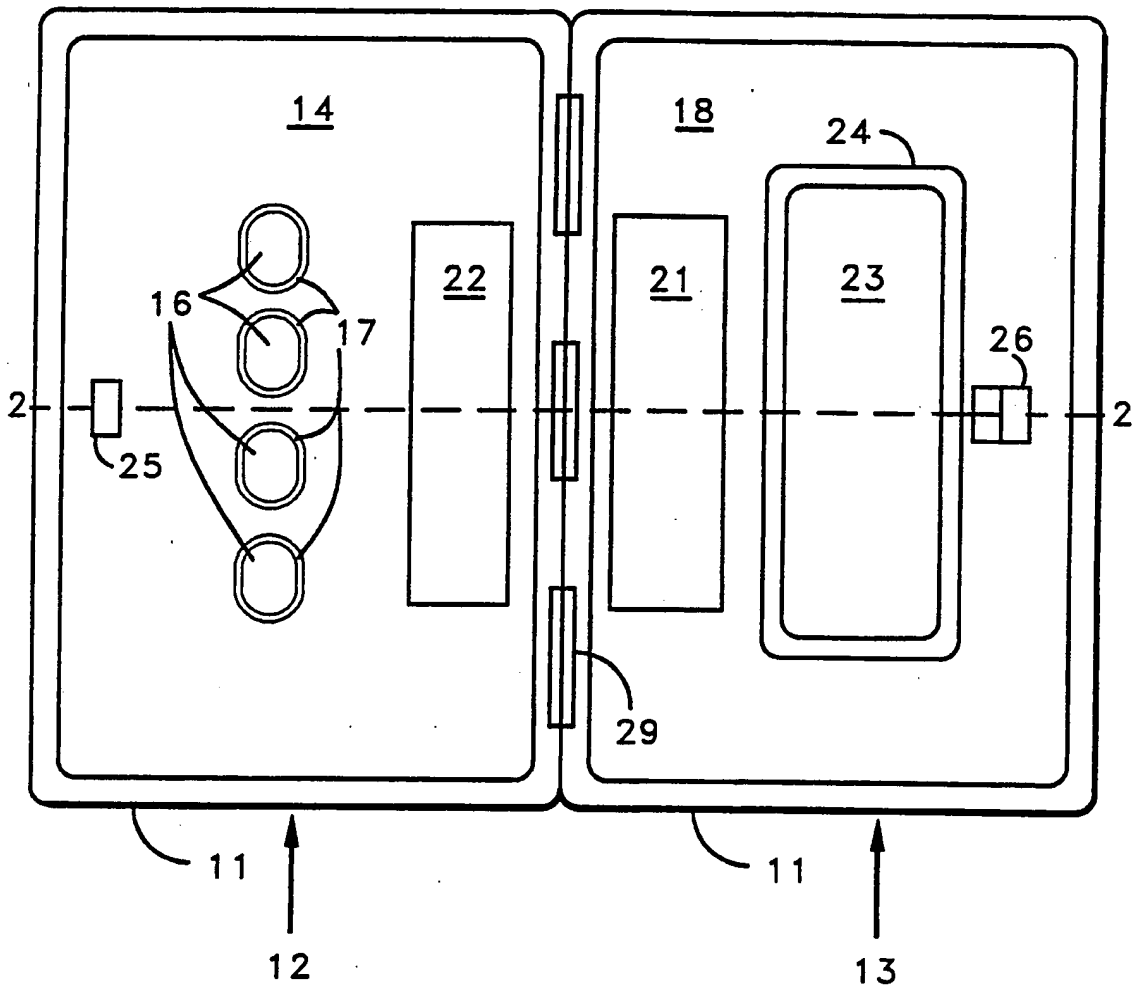

FIG. 2

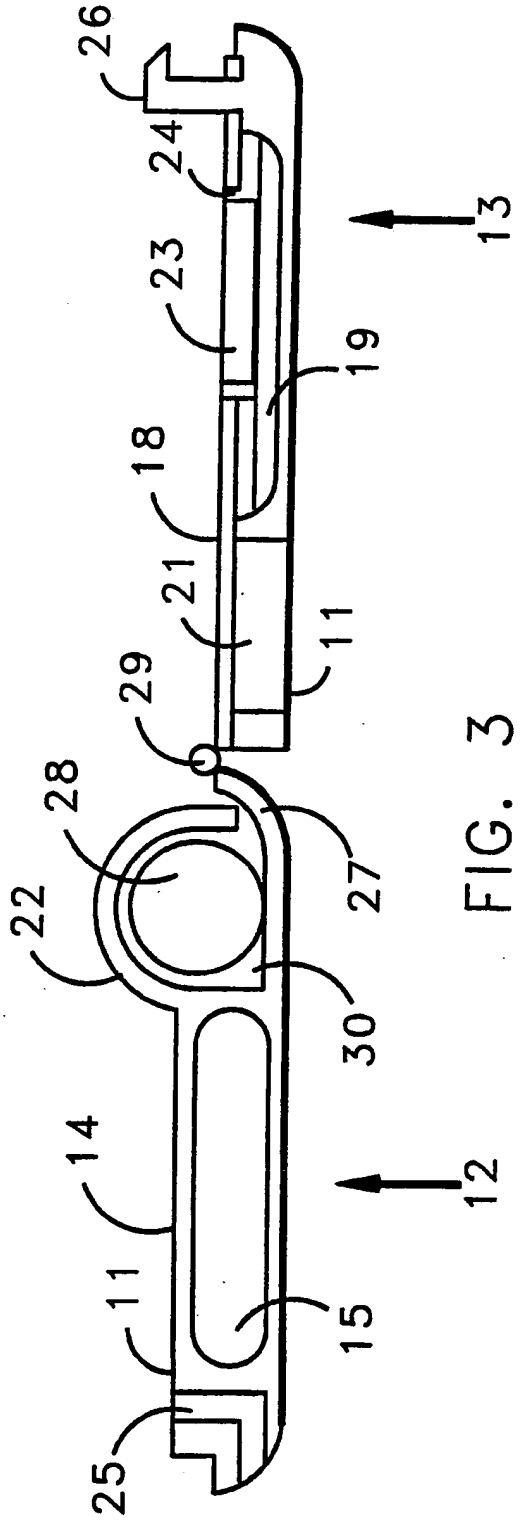

FIG. 3

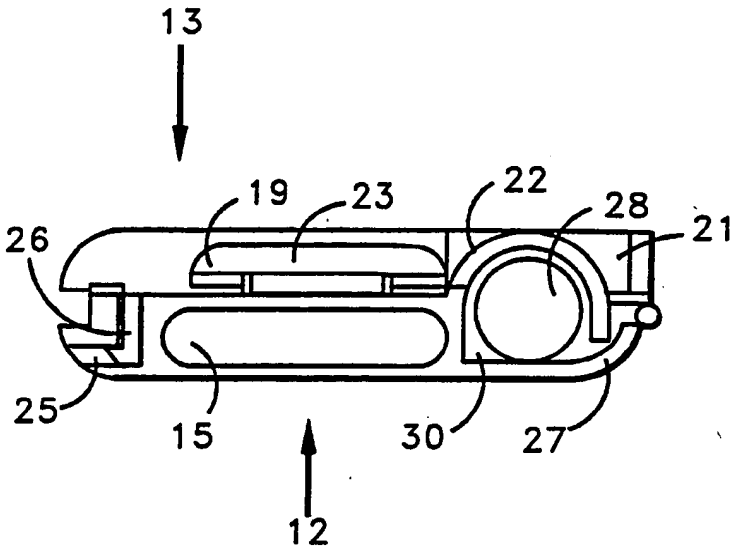

FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US90/01955

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC(5): H04B 1/03

U.S. CL: 455/349,351 340/311.1

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
U.S.	455/343,347-348,351,127 361/398,399,412,415,422 340/311.1 364/708 73/431

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, X, 4,439,726 (HOCHREVTHER et al) 27 March 1984; see figures 3 and 5.	1,11
X Y	US, X, 4,126,863 (KOLWAITE) 21 November 1978, see figure 2.	1,11 1,11
Y	US, Y, 4,083,011 (FERRELL et al) 04 April 1978, see column 1, lines 9-30.	2,12
Y	US, Y, 3,736,591 (RENNELS et al) 29 May 1973, see column 1, lines 10-15.	6,7

* Special categories of cited documents: [10]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
08 MAY 1990	10 JUL 1990
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